



Oil PAH PFAS VOC TBT
NAPL Arsenic Lead PCB



Tektoseal® Active

Environmental protection with engineered pollutant filters

 **HUESKER**
Ideas. Engineers. Innovations.

Global challenges

The requirements related to contaminated site remediation and groundwater protection are constantly increasing and call for ways to implement environmental protection measures in the best possible way.

ENVIRONMENTAL PROTECTION

The protection of the environment is playing an increasingly important role socially, politically and industrially

WATER PROTECTION

Water quality and the protection thereof are intensively regulated and tested more frequently

GUIDELINES

Stricter state environmental protection guidelines for industry, infrastructure and agriculture

HEALTH

The accumulation of pollutants in organisms is a pathway of entry into the food chain

REMEDIATION OBLIGATION

Obligation for environmental remediation according to the polluter pays principle

PREVENTION

The prevention of pollutants entering the environment is becoming increasingly important for the economy as a whole

POLLUTANTS

Knowledge about environmentally harmful substances is increasing

CONTROL

Stricter environmental controls and penalties for violations



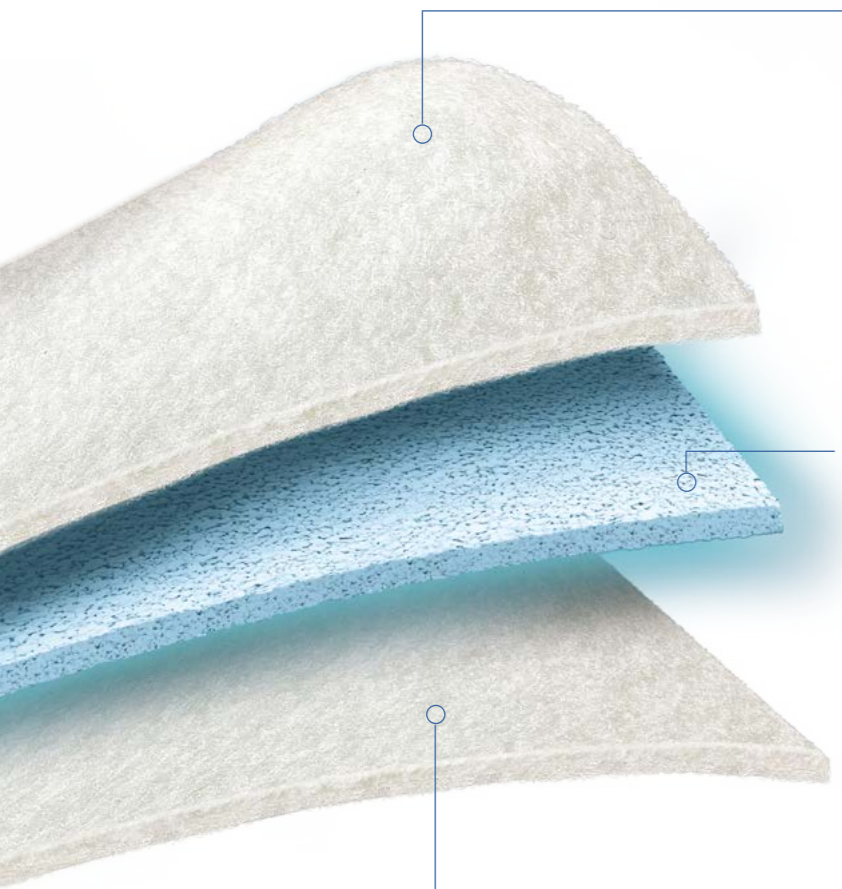
Active environmental protection

Tailor-made permeable contaminant barriers for nearly every application

Tektoseal Active are active geocomposites installed as contaminant filters or contaminant barriers for soil and groundwater protection, as well as for contaminated site capping. They reliably sorb pollutants and allow the carrier medium (water, soil air, landfill gas, etc.) to pass through purified. Our active geocomposites provide uniform and erosion-resistant pollutant filter layers over a large area.

Tektoseal Active allows passive treatment of e.g. contaminated leachate, pore water, drainage and traffic runoff water etc. Contamination of soils and groundwater by inorganic, organic or petrochemical pollutants is thus prevented.

Pollutant carryover from already contaminated soils and sediments is also prevented by filtering out contaminants washed out by precipitation or groundwater. Moreover the contaminated earth body is successively decontaminated, or passively cleaned, as more and more pollutants are flushed into the pollutant filter and safely sorbed over time.



Top layer
A nonwoven or woven fabric made of polypropylene (PP) or polyester (PET), which serves as a stabilizer for the active material and as a protective layer against external influences. Raw material and basis weight are adapted to the specific requirements.

Active layer
The active layer is the heart of the Tektoseal Active products. It may contain the following substances, amongst others:

- Activated carbon
- Heavy metal binder
- Oil absorber

Bottom layer
The material of this layer can be varied according to the field of application to ensure the required strengths or protective properties. Possible materials are woven or nonwoven fabric, optionally with geogrids as reinforcement.



Quick installation of a filter layer with a permanent constant layer thickness



Improvement of water quality through filtration of dissolved pollutants



Pollutant removal without surface sealing and interrupting of the natural flow paths of the water



Contribution to health and environmental protection by reducing pollutant effects



Reduction of transport through on site containment



Higher performance with savings in mineral pollutant barrier layers

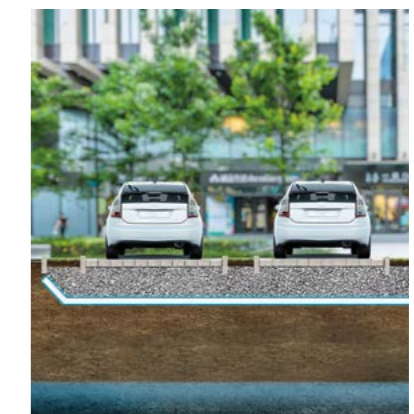
Application examples using Tektoseal Active



Soil capping



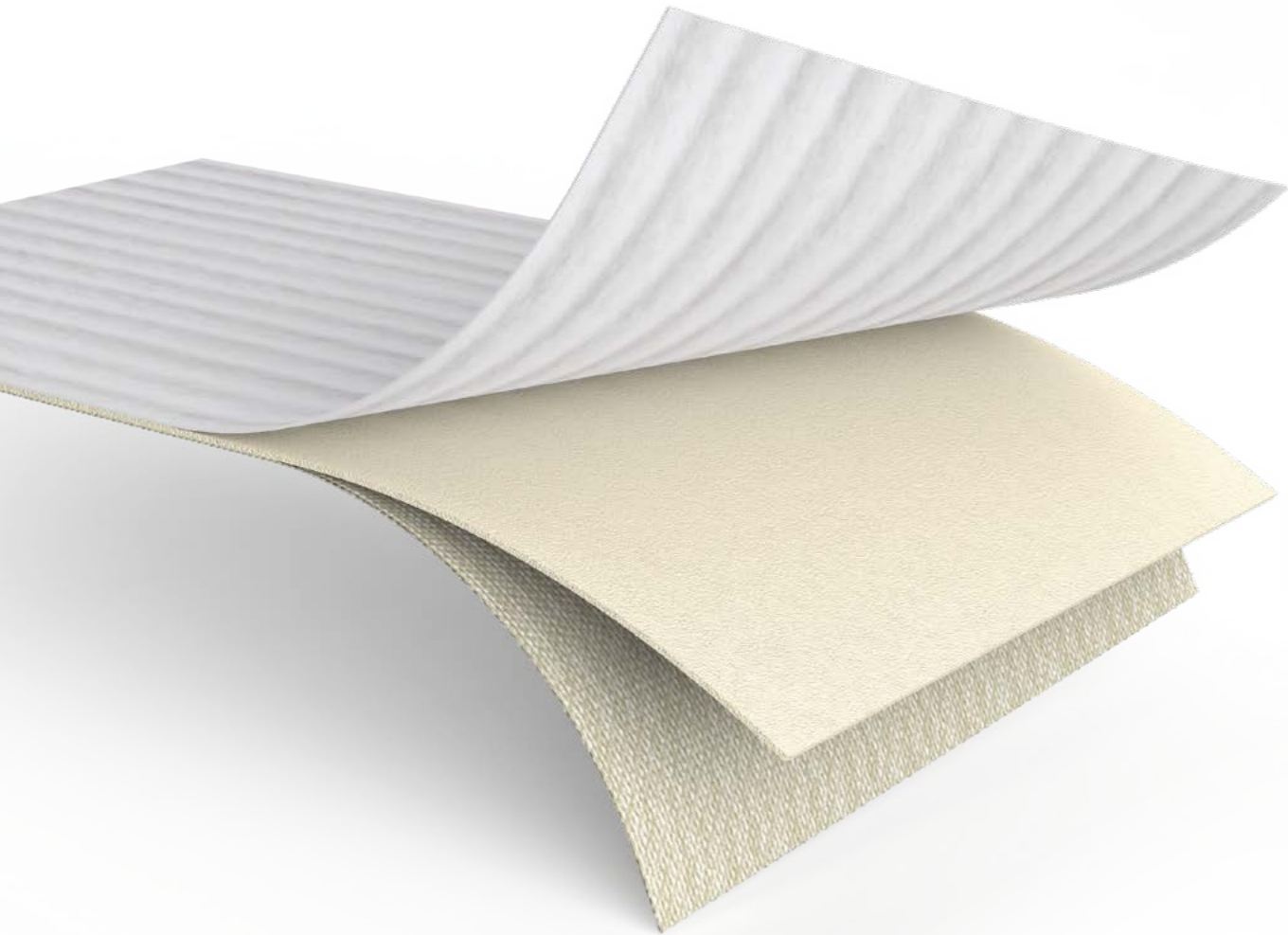
Runoff filtration



Groundwater protection

Tektoseal Active PFAS

Pollutant barriers for per- and polyfluorinated alkyl substances (PFAS)



Highest performance for short and long chain PFAS

Tektoseal Active PFAS combines the benefits of geotextiles with proven reliable contaminant sorbents. This way, contaminated soils can be reliably contained and remediated. Our pollutant filters can be installed in soils and even under water. The fast reaction kinetics and high uptake capacity of the sorbents allow reliable application to a wide range of PFAS pollutants.

An application is possible for contaminated site remediation with short and long chain per- and polyfluorinated alkyl substances such as PFOA, PFOS, PFNA, PFHxA, PFHxS, PFBS, PFBA and PFPeA. If individual remediation measures focus in particular on the long-chain PFAS, the use of selected activated carbon can also yield benefits.

It is recommended that active component compatibility be investigated on a project specific basis. For a more in-depth analysis of your individual problem, our team of experts is always at your disposal.

High performance for short and long chain PFAS

Special high performance textiles and the selective ion exchanger ensure the highest pollutant sorption capacity in a wide range of applications.

Alternative solution for long-chain PFAS

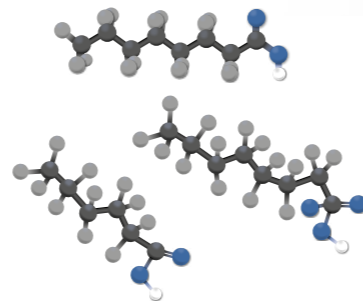
High-performance textiles and selected activated carbon form a contaminant barrier in selected applications.



Selective ion exchanger



High capacities due to ion exchange and adsorption



For all short and long chain carboxylic and sulfonic acids

Our product solution of engineered geotextiles, combined with the selective ion exchanger, can be used for virtually any PFAS remediation project and can be used safely over the long term. The PFAS are permanently and reliably bound by ion exchange and adsorption.



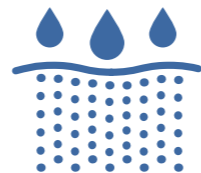
Effective

Removal of all PFAS with a proven effectiveness of > 99.9% (tested at concentration ranges of < 1 - 4,000 µg/l)



Efficient

Proven loading capacity of up to 7,000 µg/g at high concentrations and therefore a significantly higher pollutant uptake capacity than many other adsorbers



Fast

Sorption speeds of less than 3 minutes allow the use even at high seepage flow velocities



Strong

Extremely high binding strength ensures that no more than 0.01 - 0.1% of the bound PFASs are released again (desorption)



Permanent

The durability of our materials enables the protection or even the reuse of contaminated soils in technical structures for long periods of time while at the same time passive soil decontamination with the help of natural precipitation

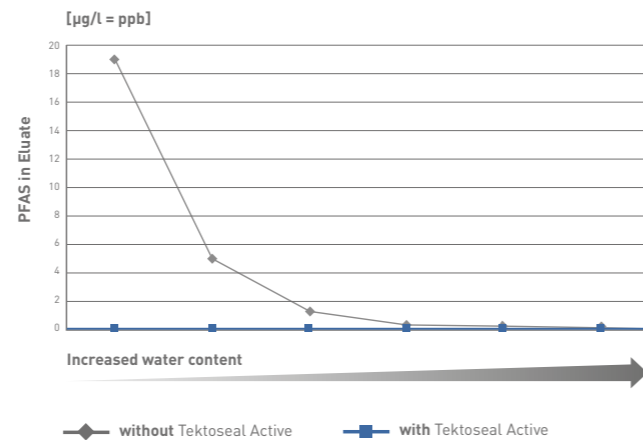


Reliable

It has been proven that our active geocomposite material can also be used for applications with landfill leachates

Confirmation of high effectiveness by independent laboratories

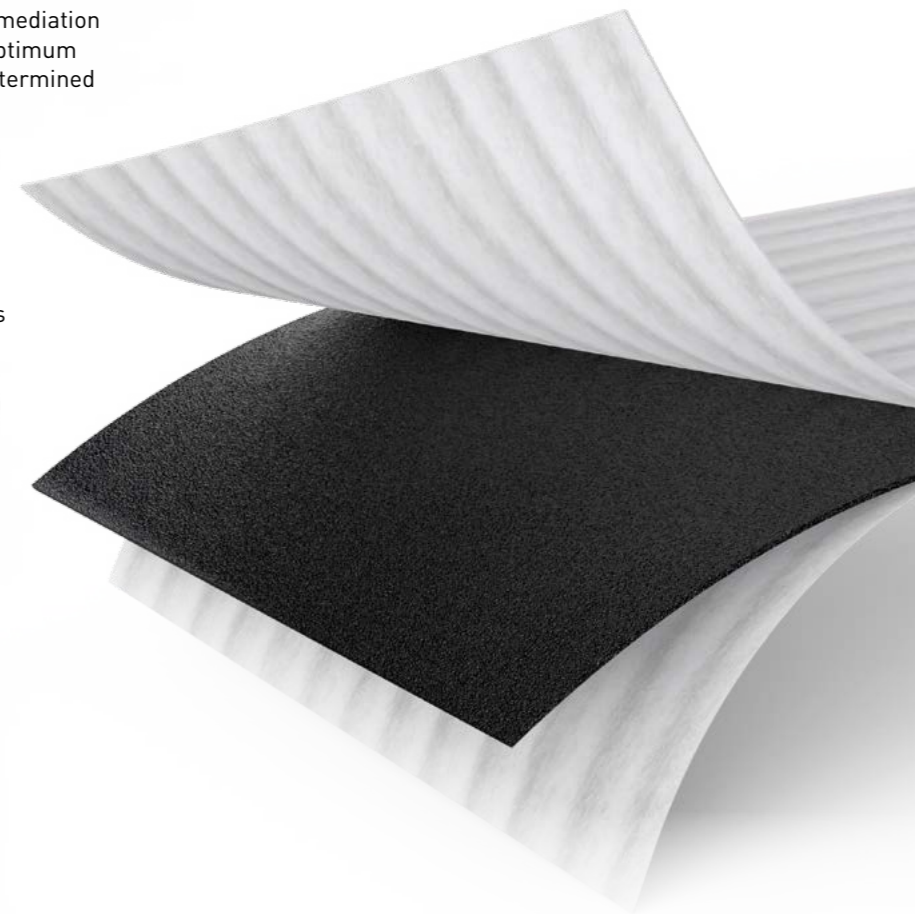
Independent, international laboratories have proven that our geocomposites with selective ion exchanger remove both long and short chain PFAS better than many other adsorbers. Desorption at a later stage is also excluded due to the extremely high binding strength. The high effectiveness of Tektoseal Active PFAS was demonstrated in lab tests and field trials. It is shown that the pollutants are reliably taken up at first contact with leachate.



The alternative solution with selected activated carbon for long-chain PFAS

Depending on the challenges on site, a product variant with activated carbon can also lead to effective pollutant removal. The many boundary conditions in the remediation of PFAS projects mean that the selection of the optimum adsorber is generally not trivial, but should be determined in advance with the aid of preliminary tests.

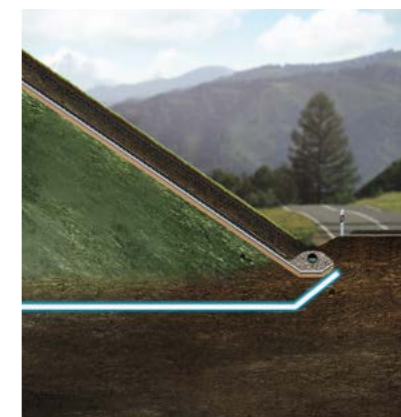
- Containment for contaminated soils on land and sediments under water, with simultaneous passive cleaning
- Activated carbon is known and recognized as a highly efficient adsorber of organic pollutants
- Project-specific product configuration for maximum performance



Application examples using Tektoseal Active for PFAS



In-situ containment of contaminated soils



Building with contaminated soils



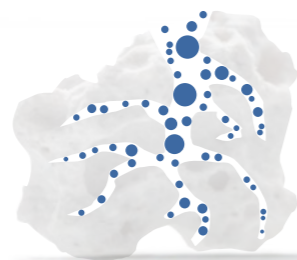
Landfill sealing

Tektoseal Active for heavy metals

Surface filter for inorganic pollutants



Cation adsorber as powerful active ingredient



High capacity due to pollutant adsorption



Applicable for inorganic pollutants



The large-area barrier for heavy metals, radionuclides, phosphates and Co.

With Tektoseal Active product solutions for inorganic pollutants, you can reliably secure, remediate or preventively protect contaminated soils, sediments and waters from pollutant discharge. Our product solutions combine the advantages of geotextiles with the active substances particularly suitable for this purpose - our cation adsorber and zeolite. Thanks to the fast and high pollutant absorption, it is possible to build very thin and at the same time long-term safe pollutant filters.

Our Tektoseal Active solutions with the particularly powerful cation adsorber can be used as permeable barriers for substances such as lead, mercury, arsenic, etc. A product configuration with zeolite increases the cation exchange capacity of filter and barrier layers. Our team of experts will, at any time, be happy to provide you with a detailed analysis of any project-specific queries you may have.

Maximum performance with heavy metals and phosphates

High-performance textiles combined with a special cation adsorber, ensure maximum pollutant absorption capacity.

The alternative for selected types of metal

High-performance textiles, combined with zeolite (mineral molecular sieve), ensure reliable pollutant absorption in soils, for example, with weak cationic contamination.



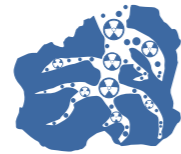


In addition to removing dissolved inorganic substances from water, the active ingredient neutralizes acidic water to a neutral pH. The pollutant filter can be used to prevent environmental contamination by nickel, aluminium or copper. For example, sediments and soils near mine dumps, heavy industry, and other potential hazard sources can be treated. This protects surface and groundwater, people, animals and our environment without the need for costly treatment plants.



Effective

Arsenic, lead or mercury etc. can be removed from the carrier medium (water or gas) with an effectiveness of more than 97 %



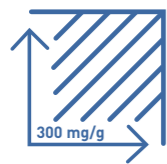
Adsorption

Radionuclides such as uranium, radium or strontium have also been proven to be adsorbed with an effectiveness of more than 90 %



Neutralization

The mineral structure neutralizes acidic waters and buffers the pH value to a level of approx. 7 (neutral)



Maximum performance

Based on laboratory studies, large quantities of metals and radionuclides can be bound



Fast

Thanks to the fast reaction kinetics of less than 3 minutes, large quantities of water can be filtered in a very short time

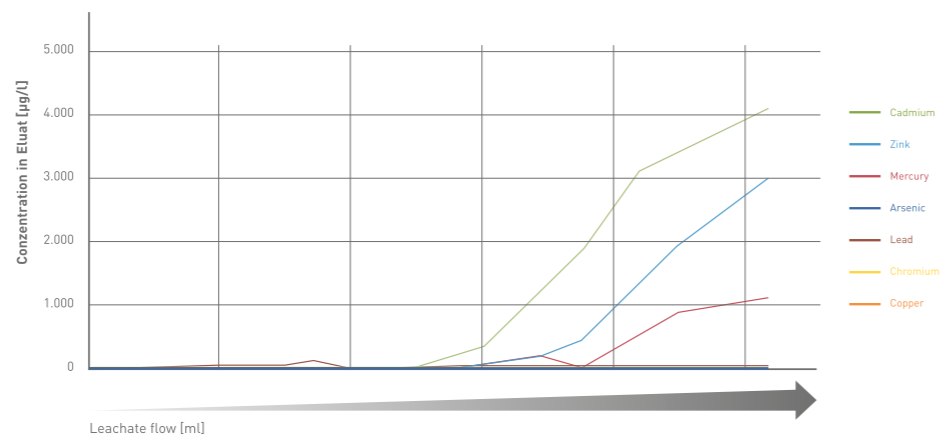


Variable

High cation exchange capacity enables application in diverse installation situations on land and under water

Confirmation of highest effectiveness by independent laboratories

Our geocomposites with special cation adsorber bind a variety of harmful inorganic substances. The cation adsorber is a proven highly effective active substance for the treatment of pollutants and can be laid in combination with our geotextiles in a permanently mechanically stable manner.



The natural alternative solution with zeolite for lightly contaminated soils and ashes

Depending on the situation, a product variant with zeolite - the mineral molecular sieve - can also be advantageous. Zeolite has a high cation exchange capacity and can be used, for example, in the backfilling of old building materials, contaminated soils or ashes. The many boundary conditions associated with inorganic pollutants mean that the selection of the adsorber should be determined, if necessary, with the aid of preliminary tests. This option is available to you via our experts and engineers.

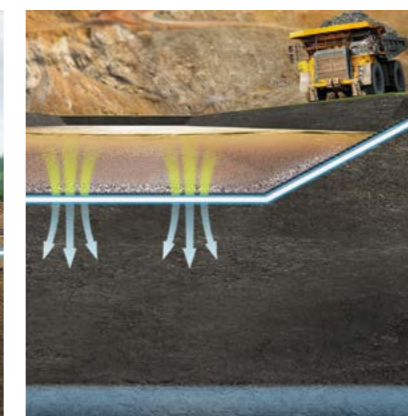


- Realization of a high cation exchange capacity in the filter or barrier layer
- Securing contaminated soils in the field
- Additional safety when building with substitute building materials and low-polluted substances
- Project-specific and economical product configuration by our experts

Application examples using Tektoseal Active for heavy metals



Soil air filter on contaminated sites



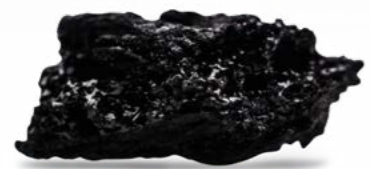
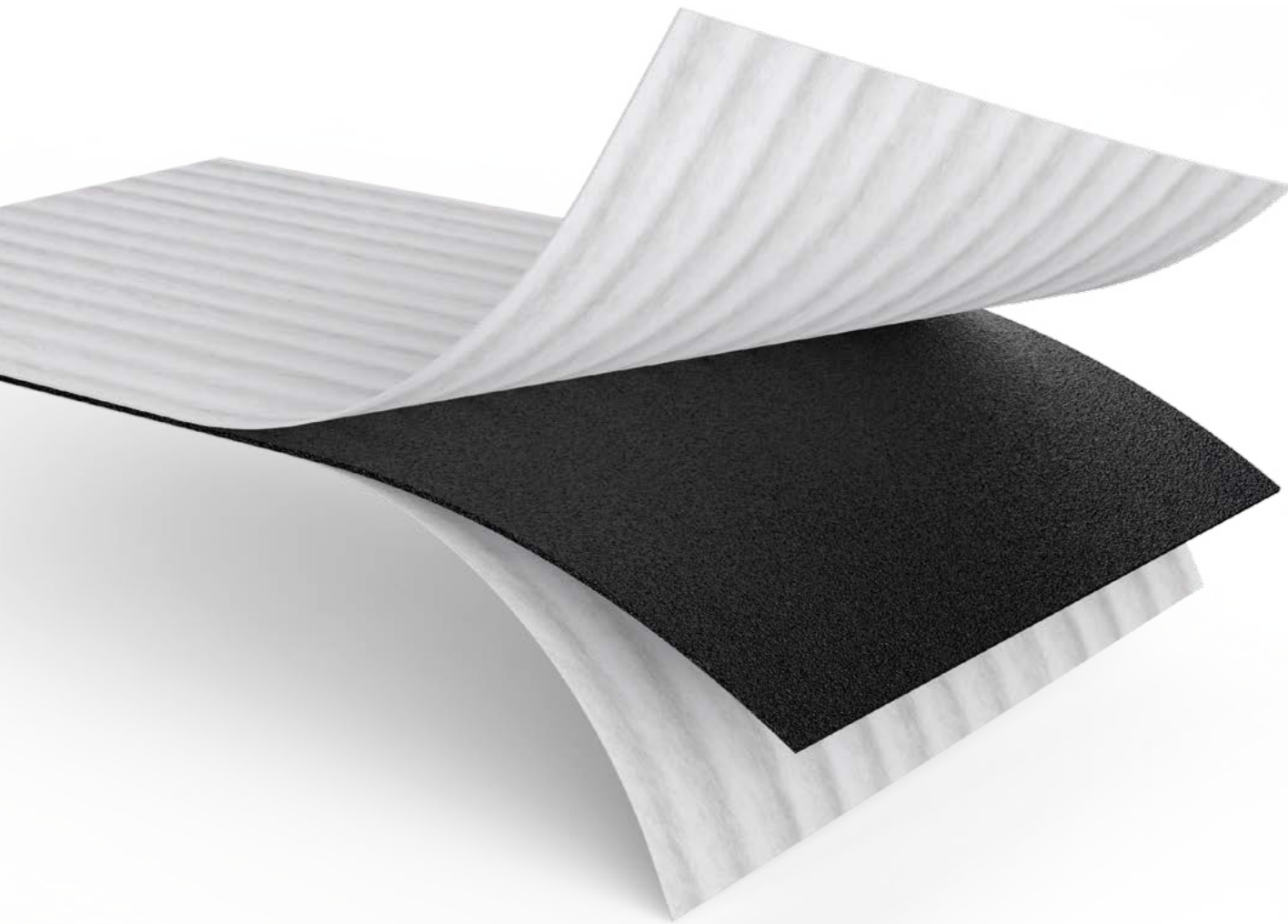
Filtration of polluted surface waters



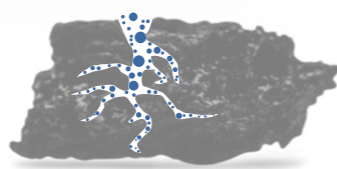
Isolation of contaminated sediments

Tektoseal Active for organic pollutants

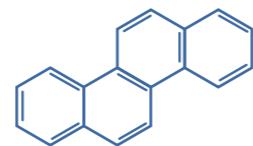
The pollutant filters for long-lasting persistent organic pollutants



Project-specific selected activated carbon



Effective pollutant adsorption



Use on a wide range of dissolved organic pollutants such as VOCs, TBTs, PAHs, PCBs, and more



Pollutant barrier for dissolved organic contaminants with activated carbon as a reliable pollutant adsorber

With Tektoseal Active product solutions for organic pollutants, you can reliably secure and remediate contaminated soils and waters. Persistent organic pollutants (POP) occur in gaseous form, dissolved in water or attached to dust particles as well as in soils. With our products, these pollutants can be safely absorbed at any stage. Our product solutions combine the advantages of geotextiles with the pollutant adsorbers – activated carbon and Organoclay – which are particularly suitable for this purpose.

Our Tektoseal Active solutions (with special activated carbon) can be used as permeable barriers for dissolved organic pollutants such as VOCs, TBTs, PAHs, PCBs, etc. in soil, air and gases as well as in surface and groundwater. A product configuration with Organoclay is especially recommended for organic pollutants with oil compounds. For example, loads from coal tar and creosote (so-called non-aqueous phase liquids, NAPLs) can be reliably adsorbed or treated.

Highest performance for dissolved organic pollutants

High-performance textiles, combined with special activated carbon, ensure reliable adsorption of pollutants from water and gases.



Highest performance for organic pollutants in oily environments

High-performance textiles, combined with swellable organoclay, provide reliable pollutant adsorption.





Tektoseal Active (with special activated carbon) in combination with our geotextiles can be used for large-scale treatment of dissolved organic pollutants. The persistent substances adsorb permanently and reliably on the activated carbon. The easy solubility of many organic substances with water is used to specifically induce leaching of the pollutants. This allows sediments and soils to be treated in-situ and protects groundwater, people, animals and the environment.



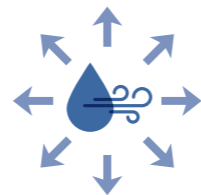
Fuse

Securing of contaminated soils on land as well as sediments under water



Effective

Reliable removal of dissolved organic pollutants such as VOC, TBT, PAH, PCB and many more



Multifunctional

Pollutant adsorption from liquids and gases possible



Permanent

Large surface area (1 g activated carbon corresponds to approx. 1,000 m²) leads to high pollutant absorption capacity



High-performance

Project-specific product configuration with suitable activated carbon types for maximum performance



Recognized

Activated carbon is known and recognized as a highly efficient adsorber of organic pollutants

Proven excellent pollutant protection with geotextiles and activated carbon

Activated carbon is known as an adsorber for pollutant treatment and can be permanently mechanically stabilized and laid over large areas in combination with our geotextiles. In this project video, you can see how a very complex protection concept can work with a multifunctional and multi-layer surface sealing system made of geobuilding materials and Tektoseal Active.

Click here to watch the video →

Tektoseal Active with Organoclay for organic pollutants in oily environments

Our Tektoseal Active product variant with Organoclay offers more effective pollutant protection for organic pollutants in an oily environment. Contaminants originating, for example, from heavy industry or from the impregnation of wood cannot, in some cases, be treated effectively with activated carbon, since the oily substances cover the activated carbon like a film. For these applications, the Tektoseal Active pollutant adsorber Organoclay is the best solution. In contact with the substances, the adsorber swells so that the product becomes almost impermeable to pollutants flowing in.



- Protection for contaminated soils on land and sediments under water
- First choice for organic pollutants in conjunction with oil compounds
- Chemical treatment of the base material bentonite makes it an oliophilic pollutant adsorber
- Pollutant filters with constant and erosion-proof layer thickness throughout
- Project specific product design

Application examples using Tektoseal Active for organic pollutants



Landfill sealing



Isolation of contaminated sediments



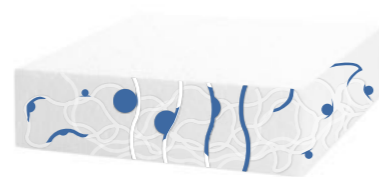
Soil air filter on contaminated sites

Tektoseal Active for oils and petrochemicals

The pollutant barrier for oil, gasoline, diesel and kerosene



High performance polymer



Effective pollutant absorption



Use with oil, gasoline, diesel and kerosene



The heavy-duty oil absorption mat for use in infrastructure, on construction sites and in waterways

Today, it is impossible to imagine infrastructure and industry without oils, diesel, gasoline and kerosene. Through leaks or in accidents, they find their way from unsealed traffic areas into the subsoil and thus into our environment. Tektoseal Active absorbs the substances and helps prevent surface contamination and contain the spread. Preventive protection against these contaminants is important for adjacent soils and waters.

Our Tektoseal Active solutions with mechanically solidified oil-absorbing polymer are suitable for separating oil-water mixtures. By using different geotextiles, stable composites are produced which, depending on the area of application, can also be buoyant or withstand high UV radiation for a certain period of time. This way, the products can be integrated into our infrastructure or contaminated sites can be secured.

Application areas include ports and harbours, railways, temporary fuelling and service areas on site and under parking lots as well as in the road shoulder and many other situations.

Preventive protection against contamination of oil, diesel and gasoline

The powerful combination of protective nonwovens and consolidated oil absorber.

The solution for organic pollutants in oily environments

High-performance textiles combined with Organoclay, which swells in contact with the pollutant to create a barrier.



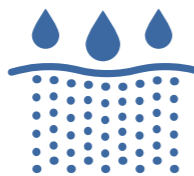


Many oil binders on the market today are not able to withstand external influences; absorbents can be carried away by wind and water. Nonwoven-based oil binders have low strength, especially after oil absorption. Our Tektoseal Active solution combines a high-performance, consolidated and sorbent polymer with the mechanical stability of geotextiles. This combination extends the range of applications and the service life of the oil absorber and can be individually adapted to new challenges. The composite material can be quickly laid out as roll material and also disposed of again. In addition, it can be easily cut on site and adapted to the specific situation.



High-performance

1 m² binds up to 7 litres of oil



Water-permeable

Absorbs oil and allows water to pass



Stable

High mechanical strength even when driven over with heavy equipment



Uncomplicated

Easy installation in-situ and easy to cut



Buoyant

The product can be configured to float



Certified

Considered a certified oil binder in Germany



**eco
LINE**

The even more ecological product variant

In our ecoLine product line you will find various geotextiles made from recycled PET bottles. Our Tektoseal Active AS is also available in the ecoLine. The backing and top layer of the product are made of recycled PET to the benefit of the circular economy, whilst also increasing the tensile strength of the product. This ensures that Tektoseal Active AS ecoLine can be removed, e.g. with an excavator. After dismantling, it is possible to recycle the material.

Tektoseal Active with Organoclay for organic pollutants in oily environments

Our Tektoseal Active product variant with special Organoclay offers more effective protection for organic pollutants in an oily environment. Contaminants originating, for example, from heavy industry or from the impregnation of wood can be treated effectively in this way. In contact with the substances, the adsorber swells so that the product becomes almost impermeable. They can be used for coal tar, creosote (non-aqueous phase liquids, NAPLs) and many other applications.



- Protection for contaminated soils on land and sediments under water
- First choice for organic pollutants with oil compounds
- Chemical treatment of clays makes them oliophilic pollutant adsorbers
- Pollutant filters with a constant erosion-proof active layer
- Project-specific product design

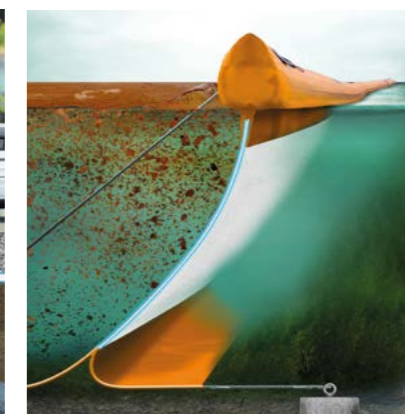
Application examples using Tektoseal Active for oils and petrochemicals



Decentralized runoff treatment on roads



Environmental protection on maintenance and parking areas



Oil curtain in water bodies

The best product for every project

Together we always find the best possible product configuration for your project!



1. Situation analysis and target definition

Together with you, we evaluate project-specific issues such as the pollutant situation and local soil and groundwater conditions. Since no project is the same, we develop appropriate product configurations and solution approaches for the specific objective.



2. Project-specific preliminary tests

For projects with challenging baseline conditions and targets, we are happy to perform laboratory tests on the contaminated leachate or your soil sample. The best project-specific active ingredient is selected by simulating the specific site conditions, and its effectiveness is determined.



4. Final product configuration

Based on the successful preliminary tests and the planning of the installation concept, your Tektoseal Active product solution is finally designed by combining the best active ingredient and the right geotextiles.



3. Development of the installation concept

After the successful pre-testing phase, we develop the installation concept taking into account the specific application. Finally, a laying plan containing all the construction details is formulated.



5. Delivery & construction supervision

The product is manufactured as requested and delivered to the construction site. Our engineers will also be happy to assist you with the installation on site.

Your product configuration kit of Tektoseal Active products for ...

	PFAS	Heavy metals	Organic pollutants	Oils and petrochemicals		
	✓	—	—	—	Ion exchanger	
	✓	—	✓	—	Selected activated carbon	
	—	✓	—	—	Cation adsorber	
	—	✓	—	—	Zeolite	
	—	—	✓	✓	Organoclay	
	—	—	—	✓	Polymer as official oil binding agent	

Project examples



Securing of contaminated sediments
Australia | Securing sediments with high PAH and CHC contamination in a Sydney bay. Installation of approx. 5,000 m² of Tektoseal Active AC as a pollutant barrier layer for improving the water quality.



Pollutant and odour filter on contaminated site
Germany | Covering a contaminated site as a safety measure for construction work. Easy installation of Tektoseal Active AC. Pollutants and odours are bound by the activated carbon and do not reach the ground surface. Application as a temporary or permanent contaminated site protection.



Surface runoff treatment
Finland | Surface runoff from sealed areas contaminated with PAH and CHC is treated in a stormwater retention basin. By installing Tektoseal Active AS and AC in the bottom of the pond, pollutants are filtered out of the water before it seeps away. The basin walls are largely impermeable to water and lined with a geosynthetic clay liner.



Mine water treatment
Finland | Mine drainage containing metal can also be treated in basins next to pits and heaps. For mine water treatment in a closed nickel mine, two filter basins were lined with Tektoseal Active HM.



Pollutant filter under parking lot
Luxembourg | Tektoseal Active AS was laid underneath the gravel layer of a parking lot to prevent contaminants from entering the subsoil. Tektoseal Active AS allows water to pass through and has been proven to reliably absorb oils and fuels as well as pollutants such as metals that stick to particles. This allows for the safe design of water-permeable traffic areas.



Oil absorption in the siding
Austria | In the siding of a train station, trains are maintained, cleaned and refueled. Tektoseal Active AS is used to protect the substrate. The rolls are cut to the appropriate width at our factory and are therefore easy to install. To increase the resistance to UV radiation, the product is equipped with a UV-stabilized fabric.



Temporary construction site gas stations
Germany | A temporary refueling area for construction machinery was created for a greenfield construction project. The use of Tektoseal Active AS protects the substrate from fuel spills. The wooden planks above the filter mat ensure trafficability and protection of the mat e.g. against UV radiation and mechanical impacts.



Working in groundwater protection zones
Germany | Construction work in groundwater protection zones requires special attention to soil and water protection. Leaking lubricants and fuels from construction machinery are a hazard that is contained by Tektoseal Active AS. In this project, the contaminant filter was used under a large rotary drilling rig.

HUESKER Services

HUESKER services begin with providing the customer with initial advice and it ends with supporting the realisation of the project on site. What we provide are safe, customised, ecologically sound and economically viable project solutions.

Engineering Services

Technical consulting

We will recommend the appropriate product types for your specific requirements.

Technical design

Our engineers assist design practices by performing verifiable design calculations in accordance with international codes of practice.

Project-specific placement plans

We will prepare installation and placing recommendations plus installation diagrams.

International knowledge transfer

Best-practice solutions and techniques from our global network.

Product Services

Custom-designed project solutions

We will partner with you in developing custom-fabricated products to meet your particular requirements.

Alternative solutions

We will propose alternative design solutions as well as recommendations for adjustments and optimisations.

Documents

Certificates and approvals

Our products have numerous certifications and approvals that are issued, for example, by BAM, BAW, BBA, EBA, IVG and SVG, depending on the product type.

Tender documents

We would be happy to provide you with proposals for your specification texts.

Technical guidelines

Technical guidelines will help you to ensure the best-practice installation of your product on site.

On-The-Spot

On-site instruction

Where required, our application technicians can offer installation assistance related to the specifics of product installation.

Installation aids

We can offer you practical installation aids to facilitate the application of our products.

Training

Product and application specific instruction.



Tektoseal® is a registered trademark of HUESKER Synthetic GmbH.
HUESKER Synthetic is certified according to ISO 9001, ISO 14001 and ISO 50001.



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